Recommendations: Third COVID-19 Vaccine Dose for Individuals Receiving Dialysis (as part of an extended primary series)

23/11/2021

Overview

Since August 2021, Ontario has provided a third dose of COVID-19 vaccine to immunocompromised individuals as part of an extended primary vaccine series. Individuals receiving dialysis are among the clinical risk groups for immunosuppression in non-COVID-19 immunization guidance. They are also at an increased risk of exposure to COVID-19 due to factors related to receiving dialysis treatment (i.e., location, transportation, exposure to others). However, these individuals have not yet been identified as a group for whom a third dose (as part of an extended primary vaccine series) is recommended in Ontario or in national guidance. The Ontario Immunization Advisory Committee (OIAC) met on November 5, 2021, to review and discuss a jurisdictional scan, a synthesis of published and pre-print literature, and unpublished Ontario data on vaccine effectiveness in people receiving dialysis.

This document provides a summary of the evidence and outlines the OIAC’s recommendations for administering a third dose of COVID-19 vaccine as part of an extended primary vaccine series to individuals receiving dialysis in Ontario.

Recommendations

1. Individuals receiving dialysis (hemodialysis or peritoneal dialysis) should be offered a third dose of an mRNA vaccine as part of an extended primary series. Where operationally feasible, full dose (100 mcg) Moderna Spikevax vaccine should be provided as the third dose for this population. If Moderna Spikevax vaccine is not available, the Pfizer-BioNTech Comirnaty vaccine should be provided. The same minimum and recommended intervals used for Ontario’s third dose recommendations for immunocompromised populations should be followed.1

2. There is no information at present to inform recommendations regarding whether individuals on dialysis will need a booster dose for waning immunity after a three-dose extended primary series. The OIAC will continue to monitor the evidence on this topic to inform future recommendations.

Background

Canada’s National Advisory Committee on Immunization (NACI), and the United States’ Advisory Committee on Immunization Practices (ACIP) recommend a third dose of COVID-19 vaccine as part of an extended primary series for individuals who are moderately to severely immunocompromised.2-3 However, neither committee identified individuals receiving dialysis as a group recommended for an extended primary series in their recommendations, despite their usual inclusion within the list of patient...
groups identified as having some degree of immunosuppression as part of traditional immunization guidance. As of November 3, 2021, six provinces (Alberta, British Columbia, Manitoba, Quebec, New Brunswick, and Prince Edward Island) have announced that individuals receiving dialysis are eligible to receive a third dose of a COVID-19 vaccine as part of an extended primary series. In addition to considerations relating to immune response, the dialysis population differs from the general population in regards to the risk of COVID-19 exposure relating to frequent transportation to and from healthcare settings, close contact during hemodialysis, and home care support for peritoneal and hemodialysis.

Evidence Summary

The following summary provides a brief description of several of the studies reviewed by the committee.

A recent systematic review and meta-analysis by Chen et al., published on October 29, 2021, examined immunogenicity following COVID-19 vaccination in patients with end stage kidney disease receiving dialysis (hemodialysis and peritoneal dialysis). The review included 32 studies, including six pre-prints, involving 4,917 patients, the majority of whom received the Pfizer-BioNTech Comirnaty vaccine. The primary outcome was the proportion of individuals with end-stage kidney disease receiving dialysis who seroconverted, typically a minimum of two weeks following the final dose of a two-dose vaccine series (pooled antibody response). The secondary outcome was the proportion of patients receiving dialysis who seroconverted post-vaccination compared to those without end-stage kidney disease (pooled relative risk). The proportions who seroconverted after the first dose (relative risk [RR], 0.61; 95%CI, 0.47-0.79) and second dose (RR, 0.88; 95%CI, 0.82-0.93) were significantly lower in the dialysis group than in the control group (typically comprised of healthcare workers in a dialysis facility). This difference was less apparent after the second dose than following the first dose, although it was still statistically significant.

The above outlined systematic review is complemented by a small prospective cohort study of hemodialysis patients (n=76) and healthcare workers (n=23) that examined seroconversion four months after a second dose of Pfizer-BioNTech Comirnaty vaccine. Twenty per cent (15/76) of individuals receiving dialysis were defined as seronegative (titre below cut-off level) 16 weeks following the second dose, in contrast to the control group where no individual was seronegative. This was an increase from three weeks after the second vaccine dose when only 5.3% (4/76) of dialysis individuals were seronegative. In addition, a small study of 116 hemodialysis patients with no previous history of COVID-19 (SARS-CoV-2) infection examined product specific differences in anti–SARS-CoV-2 antibody levels three weeks after administration of the second vaccine dose. This study found that those who were vaccinated with the Moderna Spikevax vaccine showed statistically significant 2.98 fold higher anti-Spike antibody titers than patients vaccinated with the Pfizer-BioNTech Comirnaty vaccine, after adjustment for a number of factors including age, sex, diabetes status, serum albumin, dialysis dose and previous kidney transplantation.

Four studies from France, including 220 participants, examined the effect of an extended primary COVID-19 vaccine series (three doses) in the hemodialysis population. Antibody levels increased after the third dose with levels approaching those of the general population. In addition, an enhanced humoral response was observed, especially among those with lower antibody titers after two doses of vaccine. Approximately 40% of non-responders after two doses developed a strong response after the third dose. Although the sample sizes were too small to identify rare adverse events following immunization, the third dose of vaccine in these studies was well tolerated, with no serious adverse events observed.

Recommendations: Third COVID-19 vaccine dose for individuals receiving dialysis (as part of an extended primary series)
In regard to breakthrough infections in this population, a study of 15,251 dialysis patients in the United States, 69% of whom had received two doses of COVID-19 vaccine, were followed over a six month period (February to August 2021), to determine if they developed infection. Of the 650 cases identified, the majority (62%) occurred among those who were unvaccinated, and there was a significant increased risk of infection, hospitalization, and death if unvaccinated. Among 27 breakthrough infections with a measured IgG level, 67% occurred in individuals with undetectable antibodies. Breakthrough infections and hospitalization in the dialysis population were more likely among those who had received Pfizer-BioNTech Comirnaty and Janssen (Johnson & Johnson) vaccines as compared to the Moderna Spikevax vaccine, with similar results seen during both the pre-Delta and Delta variant dominant periods.
Recommendations: Third COVID-19 vaccine dose for individuals receiving dialysis
(as part of an extended primary series)

References


9. Institut national de santé publique du Québec. Avis portant sur la pertinence d’une dose additionnelle de vaccin contre la COVID-19 pour les personnes ayant une immunodépression [Internet]. Québec, QC: Gouvernement du Québec; 2021 [cited 2021 Oct 08]. Available from:


Recommendations: Third COVID-19 vaccine dose for individuals receiving dialysis (as part of an extended primary series)
About the Ontario Immunization Advisory Committee

The Ontario Immunization Advisory Committee (OIAC) is a multidisciplinary scientific advisory body that provides evidence-based advice to Public Health Ontario on vaccines and immunization matters including vaccine program implementation in Ontario, priority populations and clinical guidance. The focus of the OIAC’s work is on publicly-funded vaccines and immunization programs in Ontario, including COVID-19 and those under consideration for new programming. For more information about the OIAC and its members contact secretariat@oahpp.ca.

Acknowledgements

This statement was prepared by Dr. Diane Lu (Public Health Physician, PHO), and Kate Sanderson (Research Coordinator, PHO) on behalf of the OIAC. OIAC acknowledges the contribution of PHO staff within Health Protection, Communications Services, Library Services as well as the OIAC Secretariat.
OIAC Members

Dr. Jessica Hopkins, co-chair
Chief Health Protection and Emergency Preparedness Officer
Public Health Ontario

Dr. Jeffrey Pernica, co-chair
Head, Division of Infectious Disease
Department of Pediatrics
McMaster University

Dr. Juthaporn Cowan
Associate Scientist
The Ottawa Hospital Research Institute

Dr. Vinita Dubey
Associate Medical Officer of Health
Toronto Public Health

Dr. Julie Emili
Associate Medical Officer of Health
Region of Waterloo

Dr. Mariam Hanna
Pediatric Allergist and Clinical Immunologist

Dr. Allison McGeer
Professor, Laboratory Medicine and Pathobiology
University of Toronto
Dalla Lana School of Public Health

Dr. Justin Presseau
Scientist
The Ottawa Hospital Research Institute

Dr. Maurianne Reade
Family Physician; Associate Professor
Northern Ontario School of Medicine

Richard San Cartier
Clinical Team Lead
N’Mninoeyaa Aboriginal Health Access Centre

Dr. Beate Sander
Director (Acting)
Toronto Health Economics and Technology Assessment Collaborative

Fairleigh Seaton
Director, Infectious Disease Prevention and Environmental Health
Kingston, Frontenac and Lennox & Addington Public Health

Dr. Wendy Whittle
Maternal Fetal Medicine Specialist
Mount Sinai Hospital

OIAC Ex-Officio Members

Tara Harris
Manager
Immunization and Emergency Preparedness
Public Health Ontario

Robert Lerch
Director (Acting)
Health Protection and Surveillance Policy and Programs Branch
Ministry of Health

Dr. Daniel Warshafsky
Associate Chief Medical Officer of Health (Acting)
Office of Chief Medical Officer of Health, Public Health
Ministry of Health

Dr. Sarah Wilson
Public Health Physician
Public Health Ontario

Recommendations: Third COVID-19 vaccine dose for individuals receiving dialysis
(as part of an extended primary series)
Citation

Disclaimer
This document was prepared by the Ontario Immunization Advisory Committee (OIAC) for Public Health Ontario. The OIAC provides evidence-based advice to Public Health Ontario on vaccines and immunization matters. OIAC work is guided by the evidence available at the time this document was prepared. The application and use of this document is the responsibility of the user. PHO assumes no liability resulting from any such application or use. This document may be reproduced without permission for non-commercial purposes only and provided that appropriate credit is given to PHO. No changes may be made to this document without prior and expressed written permission from PHO.

Questions about the information in this document can be sent to secretariat@oahpp.ca.

Public Health Ontario
Public Health Ontario is an agency of the Government of Ontario dedicated to protecting and promoting the health of all Ontarians and reducing inequities in health. Public Health Ontario links public health practitioners, front-line health workers and researchers to the best scientific intelligence and knowledge from around the world.

For more information about PHO, visit publichealthontario.ca

© Queen’s Printer for Ontario, 2021